ACTION MEMORANDUM
ENGINEERING EVALUATION/COST ANALYSIS

BUILDING HH REMOVAL ACTION

MOUND PLANT
MIAMISBURG, OHIO

SEPTEMBER 2000

Public Review Draft

Revision 0

Department of Energy

BWXT of Ohio, Inc.

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PREPARED BY:

BWXT of Ohio, Inc.
P.O. Box 3030
Miamisburg, Ohio 45343-3000

for the

U.S. DEPARTMENT OF ENERGY

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ACRONYMS

AEC	Atomic Energy Commission
AM	Action Memorandum
AM/EE/CA	Action Memorandum/Engineering Evaluation/Cost Analysis
ARARs	Applicable or Relevant and Appropriate Requirements
BGS	Below Ground Surface
BVA	Buried Valley Aquifer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
D&D	Decontamination and Decommissioning
DOE	Department of Energy
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
ER	Environmental Restoration
FFA	Federal Facilities Agreement
FSP	Field Sampling Plan
HH	Hydrolysis House
ID	Identification
LSA	Low Specific Activity
mrem	millirem
MSL	Mean Sea Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NTS	Nevada Test Site

ACRONYMS (cont.)

OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
OU	Operable Unit
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
pCi/g	picoCuries per gram
PRS	Potential Release Site
RCRA	Resource Conservation and Recovery Act
RESRAD	Residual Radioactive Material Program (Software)
RI/FS	Remedial Investigation/Feasibility Study
RSE	Removal Site Evaluation
SARA	Superfund Amendments and Reauthorization Act
TRU	Transuranic
USEPA	United States Environmental Protection Agency

1. PURPOSE

The U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (USEPA) have agreed on an approach for decommissioning surplus DOE facilities consistent with the ***Policy on Decommissioning of Department of Energy Facilities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)*** dated May 22, 1995. According to this approach, decommissioning activities will be conducted as CERCLA removal actions, unless the circumstances at the facility make it inappropriate (DOE 1995a). The DOE is the designated lead agency under CERCLA and removal actions at the Mound Plant are implemented as federal-lead actions with DOE funds instead of the funds available to the USEPA under CERCLA (i.e., non-Superfund). DOE provides the On-Scene Coordinator (OSC). Non-Superfund, federal-lead removal actions are not subject to United States Environmental Protection Agency (USEPA) limitations on the OSC ($50,000 authority) and are not subject to National Oil and Hazardous Substances Pollution Contingency Plan (NCP) limitations on removal actions (i.e., $2,000,000 in cost and 12 months in duration).

This Action Memorandum (AM) has been completed to document the evaluation of site conditions, to propose the action described herein, and to allow public input.

2. SITE CONDITIONS AND BACKGROUND

2.1 SITE DESCRIPTION

This section describes the physical location, characteristics, release of contaminants into the environment and the National Priorities List (NPL) status at the site of the proposed removal action.

2.1.1 Physical Location

The Mound Plant is a 306-acre facility on the southern border of the city of Miamisburg in Montgomery County, Ohio. The Mound Plant is approximately 10 miles south-southwest of Dayton and 45 miles north of Cincinnati. This removal action is proposed for Building HH and contaminated soils in the vicinity of Building HH. The letters HH stand for Hydrolysis House. The location of Building HH is shown in Figure 2.1. The building is bordered by Building COS to the north, a hillside to the west, a roadway to the east, and a roadway to the south.

2.1.2 Site Characteristics

Building HH is a two-story, 15,276 square foot, reinforced concrete block building. The building consists of a basement, a high bay, a cooling tower, a stack, an underground tunnel, three sumps, three penthouses, three sheds, and two small attached buildings. The main services for the building include central steam for heat, chilled ethylene glycol for cooling, and electricity.

The building was constructed in 1948 to receive and process highly acidic and highly contaminated liquid radioactive waste from the processing operations in T (Technical) Building. This waste was processed to recover bismuth for reuse. Liquid waste from this process was collected in a sump in the southwest corner of Room 6 and then sent via an underground line to WD (Waste Disposal) Building. This pipeline was removed a few years ago. The polonium waste processing ended about 1958 (details available in DOE 1993). In the mid-1950's, the building was also used for several projects involving separation of Protactinium-231 (Pa-231) and Thorium-230 (Th-230), as well as other isotopes from some processed uranium byproduct materials obtained from other Atomic Energy Commission (AEC) operations.

In about 1960, Helium-3 (He-3) separation was started in Building HH using carbon traps and thermal diffusion columns. In the early 1960s, the building was used for the separation of a variety of stable isotopes using gaseous thermal diffusion, liquid

thermal diffusion, and cryogenic distillation technologies.

In the late 1970s, there was some experimental work done with uranium.

Historical information from the OU-9 Volume 7 Site Scoping Report (DOE 1993) identified two programs at Mound that involved Uranium - the Reactor Fuels Program and the Reactor Waste Decontamination Program.

The Reactor Fuels Program involved conducting basic research on the chemical and physical properties of several potential fuels - including U-235. As potential reactor fuels, these materials would have already had the daughters removed.

The Reactor Waste Decontamination Program was established to evaluate waste treatment and disposal technologies for certain radioactive wastes from the reactor fuel processing operations. The radiochemical analyses of these various waste liquids indicate the presence of the parent, U-238 or Pu-239, and a number of fission products, but not daughter products. This would be expected if the wastes were “reactor wastes” and not “reactor fuel production wastes.” See DOE 1993 for more details.

In the early 1980s, chemical exchange experimentation was also started in the building. The sulfur, calcium, and nitrogen isotopes were separated using packed columns.

Seven Potential Release Sites (PRSs) (PRS 147, 148, 149, 150, 151, 152, and 248) are associated with Building HH. The PRSs and a brief description are listed in Table 2.1. These PRSs are included in the removal action.

Figure 2.2 is a photograph of Building HH.

Table 2.1 PRSs Associated with Building HH

PRS	Description	Comments
147	HH Building Soils Note: The Core Team has not made the determination that No Further Assessment is required for all HH Building soils. The PRS package related to a specific area which was defined by the results from a soil gas survey near HH Building. The PRS was identified due to the presence of Volatile Organic Compounds and was subsequently binned NFA for these compounds. The recommendation associated with PRS 147 was not intended to make any determination regarding the protectiveness of soils underlying the HH Building footprint or within 15 feet of the building.	Evaluated by Core Team (USEPA, OEPA, and DOE/MEMP). Determined to require No Further Assessment. (See Appendix A.)
148	HH Building Solidification Unit	Previously removed.
149	HH Building Pilot Incinerator	Previously removed.
150	Room HH-15 Beta Wastewater Sump (Tank 236)	
151	Room HH-6 Alpha Wastewater Sump (Tank 237)	
152	HH Building Beta Wastewater Sump (Tank 24)	
248	HH Building Stack	

2.1.3 Release or Threatened Release into the Environment

The potential release of radionuclides prompted this removal action.

2.1.4 National Priorities List Status

The USEPA placed the Mound Plant in Miamisburg, Ohio on the NPL by publication in the Federal Register on November 21, 1989.

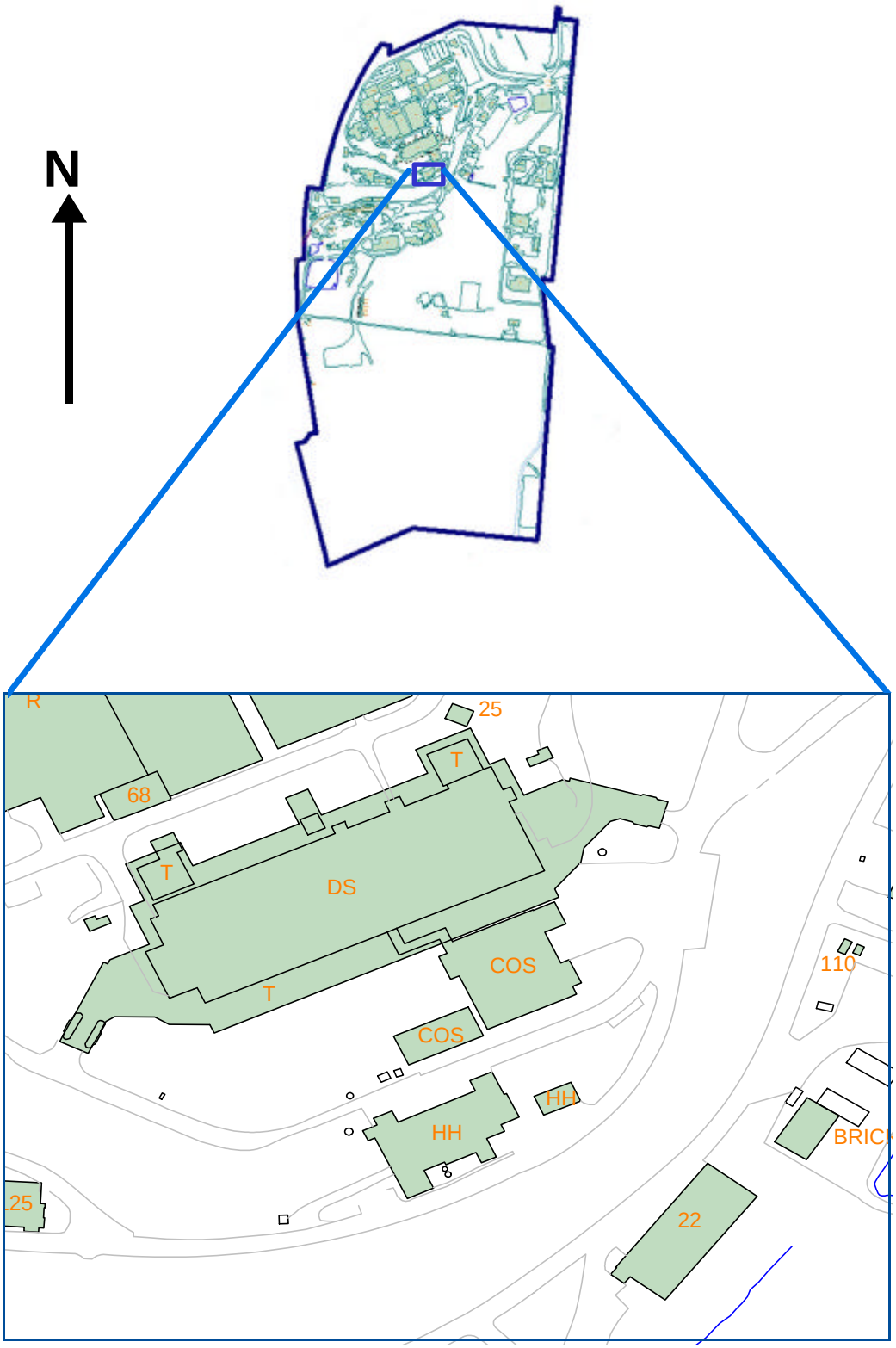


Figure 2.1 Location Of Building HH

Figure 2.2 Photo of HH Building Viewed From Southeast

2.2 OTHER ACTIONS TO DATE

The Mound Plant initiated a CERCLA program in 1989, now guided by the agreement among the DOE, Ohio Environmental Protection Agency (OEPA), and USEPA. A Federal Facilities Agreement (FFA) under CERCLA Section 120 was executed between DOE and US EPA Region V on October 12, 1990. It was revised on July 15, 1993 (EPA Administrative Docket No. OH 890-008984) to include OEPA as a signatory. The general purposes of this agreement are to:

- Ensure that the environmental impacts associated with past and present activities at the site are thoroughly investigated and appropriate remedial action taken as necessary to protect the public health, welfare, and the environment.

- Establish a procedural framework and schedule for developing, implementing, maintaining, and monitoring appropriate response actions at the site in accordance with CERCLA, Superfund Amendments and Reauthorization Act (SARA), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Superfund guidance and policy, and Resource Conservation and Recovery Act (RCRA) guidance and policy.

- Facilitate cooperation, exchange of information, and participation of the parties in such actions.

2.2.1 Previous Removal Actions

No previous CERCLA Removal Actions were conducted at Building HH. The building components (solidification unit and pilot incinerator) designated as PRSs 148 and 149 were removed previously. Administrative closure of these PRSs is included in this removal action.

2.2.2 Current Actions

Current actions pertinent to Building HH include a tritium removal project, Work Planning for D&D, Safe Shutdown, and Characterization. Work Planning consists of the up-front work required to execute building disposition activities in accordance with Environmental Safety & Health requirements, DOE orders, and best management practices. Safe Shutdown includes Building Surveillance (weekly and monthly contamination surveys), and disposition of equipment. There are two Safe Shutdown activities for Building HH. The first is the Safe Shutdown of non-hazardous process systems. Approximately twenty-four (24) non-hazardous process systems, many gas manifolds, and a variety of equipment that will be flushed, dismantled, and

dispositioned. The second Safe Shutdown activity involves the Safe Shutdown of hazardous equipment/process systems. Approximately nine process systems containing either hazardous or radioactive materials will be flushed, dismantled, and dispositioned. Characterization involves mainly supplemental building characterization. The building itself and its important components, such as the stack, the tunnel, the sumps, and the sub-basement will be characterized.

2.3 STATE AND LOCAL AUTHORITIES' ROLES

2.3.1 State and Local Action to Date

In 1990, as a result of Mound Plant's placement onto the NPL, DOE and USEPA entered into a Federal Facilities Agreement (FFA) which specified the manner in which the CERCLA program was to be implemented at Mound. In 1993, the FFA was amended to include the OEPA. DOE remains the lead agency.

2.3.2 Potential for Continued State and Local Response

OEPA will continue its oversight role until all the terms of the FFA have been completed.

3. THREAT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

3.1 THREATS TO PUBLIC HEALTH OR WELFARE

The potential release of radionuclides may create a potential threat to the public health or welfare.

3.2 THREATS TO THE ENVIRONMENT

The potential release of radionuclides may create a potential threat to the environment.

3.2.1 Removal Site Evaluation

The Removal Site Evaluation (RSE) requirements, as outlined under EPA's NCP regulations in 40 CFR 300.415, are presented throughout this AM. An evaluation by public health agencies has not been performed for this area, and, therefore, is not included in this AM.

The NCP identifies eight factors that must be considered in determining the appropriateness of a removal action [40 CFR 300.415(b)(2)]. These criteria are evaluated in Table 3.1.

Table 3.1 Evaluation of Removal Action Appropriateness Criteria [40 CFR 300.415(b)(2)]

Criteria		Evaluation
(I)	"...potential exposure to nearby human populations, animals, or the food chain..."	There is potential exposure to nearby human populations, animals, or the food chain from radionuclides when present institutional controls are relaxed.
(ii)	"Actual or potential contamination of drinking water supplies..."	There is potential contamination of on-site drinking water supplies from radionuclides. The contaminants could migrate to the ground water that is the source for the plant drinking water.
(iii)	"Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release;"	Not applicable. This removal action does not address hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage.
(iv)	"High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;"	Not applicable.
(v)	"Weather conditions that may cause hazardous substances to migrate or be released;"	This site is exposed to weather conditions. Rain might cause the associated hazardous substances to migrate.
(vi)	"Threat of fire or explosion;"	Not applicable.
(vii)	"The availability of other appropriate federal or state response mechanisms to respond to the release;" and	There are no other appropriate federal or state mechanisms to respond. The Federal Facilities Agreement (FFA) established a combined state and federal mechanism to respond under CERCLA. DOE is the designated lead agency at Mound under CERCLA
(viii)	"Other situations or factors that may pose threats to public health or welfare or the environment."	Not applicable.

4. ENDANGERMENT DETERMINATION

There is a potential or threat of release of pollutants or contaminants from this site that could pose an endangerment to public health or welfare or to the environment. To eliminate the possibility of endangerment, as the site transfers from DOE ownership and control, DOE has determined that removal of the contaminants is appropriate.

5. PROPOSED ACTION AND ESTIMATED COSTS

5.1 PROPOSED ACTION

The proposed action is the decontamination and demolition of Building HH, the stack, and removal of contaminated soils in the vicinity of Building HH. Since the proposed action is within the site boundaries, it is not expected to have a disproportionate impact on low income or minority populations.

5.1.1 Proposed Action Description

The proposed action is described as follows:

- Project Planning

  A project plan describing the progression of activities will be developed for the decontamination and demolition of Building HH. The project plan will be reviewed and approved by DOE, USEPA, and OEPA. Project specific safety documentation (HASP/JSHA) is reviewed and approved by DOE. Due to the complexity of the work, multiple work planning documents will be generated as the work progresses. Because the environmental envelope of the building is intact through the decontamination phase, work planning documents will be reviewed and approved by DOE and made available to USEPA and OEPA on request. Work planning documents for demolition of the building will be reviewed and approved by DOE, USEPA, and OEPA.

- Public Participation

  A notice of the availability of this Action Memorandum for 30 day public review will be published in a local newspaper.

- Establish Work Zones

  This activity establishes the work zones for the facility in preparation for D&D. The efforts include mobilizing equipment and personnel, establishing air monitoring for personnel and work zone perimeters, establishing the personal protective equipment (PPE) requirements and preparing PPE, installing temporary facilities and utilities (if required), construction hazard abatement, general housekeeping, soil erosion control, and establishing dust control.

- Building Decontamination

  Decontamination is the removal of residual radioactive and hazardous materials by mechanical, chemical, or other techniques to achieve a stated objective or end condition. Decontamination of Building HH includes the removal of contaminants from the contaminated sumps (PRS 150, 151, 152), the stack (PRS 248), the HH-T tunnel, underground drains, fixed contamination areas/walls, and soil.

- Install Sheet Piles

  Building HH is located on a hillside between two roadways. In order to remove the foundation of the building, approximately 150 ft long sheet pile wall will be installed along the building upper perimeter to retain the upper level roadway during demolition of the building.

- Demolish Building

  This includes demolition of the structure and waste handling and disposal. Demolition will typically be accomplished using heavy duty equipment such as excavator-mounted shear and/or grapple.

- Remove Associated Foundation and Soils

  The foundation and soils associated with Building HH will be removed.

- Verification

  This step includes among other activities: sampling and analysis of soil at the edges of the excavation to determine the residual contaminant concentration and verifying that the residual contaminant concentration is within acceptable limits. The verification sampling and analysis process will be further defined by a Verification Sampling and Analysis Plan. The primary contaminants of concern for Building HH are listed in Table 5.1 along with the risk-based clean up objectives. The primary contaminants of concern were selected based on process knowledge. Information obtained during the decontamination and demolition phases could identify additional contaminants of concern or indicate one or more of the primary contaminants of concern are not present. This will be addressed and documented in the Verification Sampling Plan. The Verification Sampling and Analysis Plan will also include a hot spot criteria. Currently, a verification result that exceeds the clean up objective by a factor of three

indicates a hot spot and the need for further excavation at that location.

- Site Restoration

  Equipment, materials, waste containers, and boundaries will be removed. The site will be back-filled and restored to industrial use standards. The grounds will be seeded and mulched.

- Documentation of Completion

  Completion of the Removal Action will be documented by an On-Scene Coordinator (OSC) report.

5.1.1.1 Rationale, Technical Feasibility, and Effectiveness

The removal action chosen is necessary for the removal of known contamination and to ensure that migration of the contamination does not occur.

5.1.1.2 Monitoring

Health and safety monitoring will be performed throughout the removal action according to standard Mound procedures. Sampling and analysis of excavated soil will be described in more detail in the Project Plan for this removal action.

5.1.1.3 Uncertainties

The major uncertainties are the concentration levels of the contaminants and the extent of contamination.

5.1.1.4 Institutional Controls

DOE will remain in control of Building HH during the removal action.

5.1.1.5 Post-Removal Site Control

Initially, post removal site control will be provided by DOE/Mound. Ownership of the Mound Plant is to be transferred to Miamisburg Mound Community Improvement Corporation (MMCIC). The Record of Decision for the parcel that includes the location of Building HH will specify the controls needed to ensure future protection of human health and the environment.

Table 5.1 Clean-Up Guidelines

Contaminant	Risk Based Guideline Value (pCi/g)	Background[c] (pCi/g)	Clean Up Objective (pCi/g)
Actinium-227 + decay products in secular equilibrium to Lead-207	10[a]	NA	10
Uranium-235	33.5[a]	0.1	33.6
Uranium-238 + decay products in secular equilibrium to Lead-206	1.2[b]	1.2	2.4[d]
Lead-210 + decay products in secular equilibrium to Lead-206	17[b]	NA	17
Thorium-230 + decay products in secular equilibrium to Lead-206	1.3[b]	1.9	3.2
Cobalt-60	1[a]	NA	1
Protactinium-231 + decay products in secular equilibrium to Lead-207	19[b]	NA	19
Tritium	235,000[a]	1.6	235,000

[a] Soil/Sediment Guideline Value for 1 x 10^{-5} risk for Construction Worker scenario, DOE 1997.

[b] Risk Based Guideline Value for the construction worker scenario at 10^{-5} risk level for soil/sediment media based upon secular equilibrium within the decay chain. The calculation of these values is presented in Appendix B.

[c] DOE 1995b.

[d] If Uranium-238 is present in concentrations greater than 2.4 pCi/g, evaluate secular equilibrium with daughters. If secular equilibrium exists, use 2.4 pCi/g as clean up goal. If secular equilibrium does not exist, adjust Uranium-238 clean up goal upward to account for reduced daughter concentrations.

5.1.1.6 Cross-Media Relationships and Potential Adverse Impacts

The potential cross-media impact associated with the removal action is the potential for unintended release of contaminated materials into the atmosphere. Careful monitoring and control will be implemented during the removal action.

No potential adverse impacts of the removal action have been identified.

5.1.2 Contribution to Future Remedial Actions

To facilitate further assessments and removal actions in or near the site of this removal action, the exact dimensions of the excavation and the levels of contamination identified and removed will be documented. The On-Scene Coordinator Report will document the removal action with photographs, drawings, and other information collected during the field work.

The information obtained, as a result of this removal, will be used in determining the availability of the Mound Plant for final disposition and will be subject to review in the subsequent residual risk evaluation.

5.1.3 Description of Alternative Technologies

Alternative technologies frequently evaluated for CERCLA remediation include institutional controls, containment, collection, treatment, and disposal. Based on the prevailing conditions, the following alternatives (in addition to the proposed alternative of dismantlement) were developed.

1. No Action
2. Institutional Controls

The performance capabilities of each alternative with respect to the specific criteria is discussed below.

5.1.3.1 No Action

The levels of radioactive contamination in Building HH and the associated soils are unacceptable. The "No Action" option was eliminated from further consideration.

5.1.3.2 Institutional Controls

Existing Mound Plant institutional controls effectively minimize the potential for contact of the subject contamination with the general public. However, after ownership is transferred, these same institutional controls will be difficult to monitor and enforce. Thus, institutional controls were eliminated from further consideration. A Removal Action is warranted.

5.1.4 Engineering Evaluation/Cost Analysis (EE/CA)

This document serves as the Action Memorandum and EE/CA.

5.1.5 Applicable, or Relevant and Appropriate Requirements (ARARs)

Mound ARARs for the ER Program have been identified (DOE 1998). CERCLA regulations require that removal actions comply with ARARs.

The following have been identified as applicable, or relevant and appropriate to this removal action:

- 49 CFR 172, 173: DOT hazardous material transportation and employee training requirements.

5.1.5.1 Air Quality

- 40 CFR Part 61 Subpart H: National Emissions Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities.
- Ohio Administrative Code (OAC) 3745-15-07(A): Air Pollution Nuisances Prohibited.
- OAC 3745-17-02 (A,B,C): Particulate Ambient Air Quality Standards
- OAC 3745-17-05: Particulate Non-Degradation Policy
- OAC 3745-17-08: (A1), (A2), (B),(D): Emission Restrictions for Fugitive Dust

5.1.5.2 To Be Considered

- EPA/230/02-89/042: Methods for Evaluating the Attainment of Clean up Standards.
- DOE Order 5400.5: Radiation Protection of the Public and the Environment

5.1.5.3 Worker Safety

- 29 CFR Part 1910: Occupational Safety and Health Act (OSHA) - General Industry Standards

- 29 CFR Part 1926: Occupational Safety and Health Act (OSHA) - Safety and Health Standards

- 29 CFR Part 1904: Occupational Safety and Health Act (OSHA) - Record keeping, Reporting, and Related Regulations

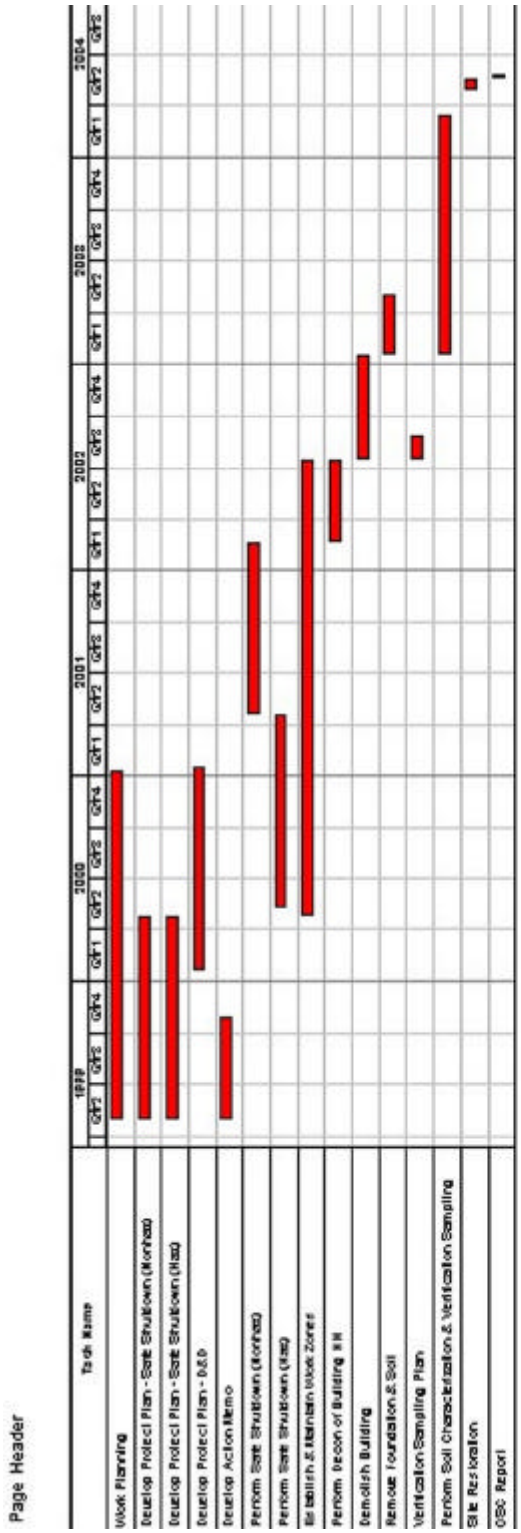
5.1.6 Other Standards and Requirements

Other standards or requirements related to the actual implementation of the response action may be identified subsequently during the design phase and will be incorporated into the Work Plan for this removal action.

5.1.7 Project Schedule

The schedule established for planning and implementing the removal action is summarized in Table 5.2.

Table 5.2 Schedule Summary



5.2 ESTIMATED COSTS

The cost estimate to perform the removal action is shown in Table 5.3. Costs include the construction activities, all engineering and construction management, and site restoration.

TABLE 5.3 REMOVAL ACTION COST ESTIMATE

COST ESTIMATE	
Activity	Cost
Work Planning	$ 204,000
Building Decontamination	184,000
Building Demolition	1,350,000
Remove Foundation & Soil	126,000
Verification	938,000
Site Restoration	84,000
OSC Report	10,000
TOTAL	$2,896,000

6. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

There is the potential for the contaminants to migrate.

7. OUTSTANDING POLICY ISSUES

There are currently no outstanding policy issues affecting performance of this removal action.

8. ENFORCEMENT

The core team consisting of DOE, USEPA, and OEPA has agreed on the need to perform the removal. The work described in this document does not create a waiver of any rights under the Federal Facility Agreement, nor is it intended to create a waiver of any rights under the Federal Facility Agreement. The DOE is the sole party responsible for implementing this clean-up. Therefore, DOE is undertaking the role of lead agency, per CERCLA and the NCP, for the performance of this removal action. The funding for this removal action will be through DOE budget authorization and no Superfund monies will be required.

9. RECOMMENDATION

This decision document represents the selected removal action for the Building HH site, developed in accordance with CERCLA as amended by SARA, and not inconsistent with the NCP. This decision is based on the administrative record for the site.

Conditions at the site meet the NCP Section 300.415 (b)(2) criteria for a removal and we recommend initiation of the response action.

Approved:

Art Kleinrath, On-Scene Coordinator	DOE/MEMP	9/18/00 Date
Timothy J. Fischer, Remedial Project Manager	USEPA	9/18/00 Date
Brian K. Nickel, Project Manager	OEPA	9/18/00 Date

10. REFERENCES

USEPA 1990. Superfund Removal Procedures Action Memorandum Guidance. Office of Emergency and Remedial Response. U.S. Environmental Protection Agency. December 1990.

DOE 1993, Operable Unit 9 Site Scoping Report Vol. 7 Waste Management, Final, Rev. 0, February 1993.

DOE 1998. List of Ohio Administrative Code and Ohio Revised Code ARARs, Letter from Nickel to Kleinrath, August 19, 1998.

DOE 1995a. Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), May 22, 1995.

DOE 1995b. Operable Unit 9 Regional Soil Investigation Report, Vol. 1-Text, Rev. 0, February, 1995.

DOE 1997. Risk Based Guideline Values, Mound Plant, Final (Rev. 4), March, 1997

Appendix A

PRS 147 Recommendation


147

PRS 147

PRS HISTORY:

The Hydrolysis House (HH) Building soils were identified as a potential release site as a result of the Soil Gas Survey and Geophysical Investigations - Reconnaissance Sampling Report, dated February 1993[2]. The area includes the paved area north of the HH Building dock and south of the roadway.

The areas associated with this potential release site have been used as an entrance to the HH Building dock. The potential release site area was utilized for shipping and receiving for HH Building operations. The history of HH Building operations is defined inn Operable Unit (OU9), Site Scoping Report, Vol. 7, Waste Management[4].

CONTAMINATION:

The Soil Gas Survey indicated that the area described above contained elevated levels of VOCs in the soil beneath the pavement. The contaminant of concern is Toluene at levels ranging from 5 to 23,142 ppb. The calculated soil gas comparison value, based on an acceptable soil screening level, is 414,600 ppb[6]. Seep 602, which is downgradient of this potential release site, indicates no detection of Toluene[5].

There is no evidence of data concerning potential radiological contamination at actual PRS location[3].

READING ROOM REFERENCES:

1) OU9, Site Scoping Report, Volume 12, Site Summary Report, Final, December 1994 (pages 5-9).
2) Soil Gas Survey & Geophysical Investigations, Main Hill and Special Metallurgy/Plutonium Processing Hill, Reconnaissance Sampling, Feb. 1993 (pages 10-12).
3) OU9, Site Scoping Report: Volume 3 - Radiological Site Survey, Final, June 1993 (pages 13-14).
4) OU9, Site Scoping Report: Volume 7 - Waste Management, Final, February 1993 (pages 15-17).
5) OU9, Regional Soils Investigation Report, Revision 2, August 1995 (pages 18-19).

OTHER REFERENCES:

6) Comparison of Actual Soil Gas Values with Calculated Acceptable Soil Gas Values (pages 20-22).

PREPARED BY:
Richard Bauer, Member of EG&G Technical Staff

MOUND PLANT
PRS 147
SOIL CONTAMINATION - HH BUILDING

RECOMMENDATION:

Potential Release Site (PRS) 147 was initially identified as a result of the Soil Gas Survey which detected toluene levels ranging from 5 to 23,142 parts per billion (ppb). Of the four (4) samples collected in the area of PRS 147, none were above the calculated soil gas guideline value for toluene of 414,600 ppb. This means that the level of toluene contamination present in soil at PRS 147 cannot adversely affect the quality of groundwater at a potential drinking water source through leaching. No detection of toluene was indicated in the downgradient seep #602, which is approximately 250 feet from PRS 147. Therefore, PRS 147 requires NO FURTHER ASSESSMENT.

CONCURRENCE:

DOE/MB: _____ 3/13/96
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA: _____ 3/21/96
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: _____ 3/14/96
Brian K. Nickel, Project Manager (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from 4/15/96 to 5/15/96.

☒ No comments were received during the comment period.

☐ Comment responses can be found on page _____ of this package.

Appendix B

Construction Worker - Soil/Sediment Exposure Pathway

Variables defined in Table 4.1.3 p93 RBGV Report 3/97
Equations listed in Table 4.1.3 p92 RBGV Report 3/97
Slope Factors from HEAST Table 4

Enter the following:

Radionuclide		Pb-210 +D (to Pb-206)	
Target Risk		1.00E-05	
Oral Cancer Slope Factor		1.01E-09	risk/pCi
Inhalation Cancer Slope Factor		3.86E-09	risk/pCi
External Cancer Slope Factor		1.45E-10	risk/pCi
Ingestion			
Target Risk	TR	1.00E-05	
Exposure Duration 1	ED_1	5	yrs
Exposure Frequency	EF	250	days/yr
Oral Cancer Slope factor	SF_0	1.01E-09	risk/pCi
Conversion Factor 1	CF_1	0.001	g/mg
Ingestion rate - Soil	IR_{soil}	480	mg/day
Radionuclide Concentration in Soil (Ingestion)	CS_{ing}	16.50	pCi/g
Inhalation			
Inhalation Cancer Slope factor	SF_i	3.86E-09	risk/pCi
Conversion Factor 2	CF_2	1000	g/kg
Inhalation Rate	IR_{air}	20	m^3/day
Soil to Air Volatilization Factor	VF	1	m^3/kg
Particulate Emission Factor	PEF	4.28E+09	m^3/kg
Radionuclide Concentration in Soil (Inhalation)	CS_{inh}	4.44E+05	pCi/g
External			
External Cancer Slope Factor	SF_e	1.45E-10	risk/pCi
Exposure Duration 2	ED_2	3.425	yrs
Gamma Shielding Factor	S_e	0.1	
Gamma Exposure Time factor	T_e	0.33	
Radionuclide Concentration in Soil (External Exposure)		67186.91	pCi/g
Total			
	CS_{TOTAL}	1.65E+01	pCi/g

Construction Worker - Soil/Sediment Exposure Pathway

Variables defined in Table 4.1.3 p93 RBGV Report 3/97
Equations listed in Table 4.1.3 p92 RBGV Report 3/97

Enter the following:

Series		U-238 to Pb-206	
Target Risk		1.00E-05	
Oral Cancer Slope Factor		1.43E-09	risk/pCi
Inhalation Cancer Slope Factor		5.08E-08	risk/pCi
External Cancer Slope Factor		7.01E-06	risk/pCi
Ingestion			
Target Risk	TR	1.00E-05	
Exposure Duration 1	ED_1	5	yrs
Exposure Frequency	EF	250	days/yr
Oral Cancer Slope factor	SF_0	1.43E-09	risk/pCi
Conversion Factor 1	CF_1	0.001	g/mg
Ingestion rate - Soil	IR_{soil}	480	mg/day
Radionuclide Concentration in Soil (Ingestion)	CS_{ing}	11.62	pCi/g
Inhalation			
Inhalation Cancer Slope factor	SF_i	5.08E-08	risk/pCi
Conversion Factor 2	CF_2	1000	g/kg
Inhalation Rate	IR_{air}	20	m^3/day
Soil to Air Volatilization Factor	VF	1	m^3/kg
Particulate Emission Factor	PEF	4.28E+09	m^3/kg
Radionuclide Concentration in Soil (Inhalation)	CS_{inh}	3.37E+04	pCi/g
External			
External Cancer Slope Factor	SF_e	7.01E-06	risk/pCi
Exposure Duration 2	ED_2	3.425	yrs
Gamma Shielding Factor	S_e	0.1	
Gamma Exposure Time factor	T_e	0.33	
Radionuclide Concentration in Soil (External Exposure)		1.39	pCi/g
Total			
	CS_{TOTAL}	1.24E+00	pCi/g

Cancer Slope Factors
HEAST Table 4

Series	Segment	Ingestion	Inhalation	External Exp
U-238	U-234	4.70E-11	1.30E-08	2.65E-07
U-234	Th-230	4.40E-11	1.40E-08	2.14E-11
Th-230	Ra-226	3.75E-11	1.72E-08	4.40E-11
Ra-226	Pb-210	2.96E-10	2.75E-09	6.74E-06
Pb-210	Pb-206	1.01E-09	3.86E-09	1.45E-10
	Total	1.43E-09	5.08E-08	7.01E-06

Construction Worker - Soil/Sediment Exposure Pathway

Variables defined in Table 4.1.3 p93 RBGV Report 3/97
Equations listed in Table 4.1.3 p92 RBGV Report 3/97

Enter the following:

Series		Th-230 to Pb-206	
Target Risk		1.00E-05	
Oral Cancer Slope Factor		1.34E-09	risk/pCi
Inhalation Cancer Slope Factor		2.38E-08	risk/pCi
External Cancer Slope Factor		6.74E-06	risk/pCi
Ingestion			
Target Risk	TR	1.00E-05	
Exposure Duration 1	ED_1	5	yrs
Exposure Frequency	EF	250	days/yr
Oral Cancer Slope factor	SF_0	1.34E-09	risk/pCi
Conversion Factor 1	CF_1	0.001	g/mg
Ingestion rate - Soil	IR_{soil}	480	mg/day
Radionuclide Concentration in Soil (Ingestion)	CS_{ing}	12.41	pCi/g
Inhalation			
Inhalation Cancer Slope factor	SF_i	2.38E-08	risk/pCi
Conversion Factor 2	CF_2	1000	g/kg
Inhalation Rate	IR_{air}	20	m^3/day
Soil to Air Volatilization Factor	VF	1	m^3/kg
Particulate Emission Factor	PEF	4.28E+09	m^3/kg
Radionuclide Concentration in Soil (Inhalation)	CS_{inh}	7.19E+04	pCi/g
External			
External Cancer Slope Factor	SF_e	6.74E-06	risk/pCi
Exposure Duration 2	ED_2	3.425	yrs
Gamma Shielding Factor	S_e	0.1	
Gamma Exposure Time factor	T_e	0.33	
Radionuclide Concentration in Soil (External Exposure)		1.45	pCi/g
Total			
	CS_{TOTAL}	1.29E+00	pCi/g

Cancer Slope Factors
HEAST Table 4

Series Segment		Ingestion	Inhalation	External Exp
Th-230	Ra-226	3.75E-11	1.72E-08	4.40E-11
Ra-226	Pb-210	2.96E-10	2.75E-09	6.74E-06
Pb-210	Pb-206	1.01E-09	3.86E-09	1.45E-10
	Total	1.34E-09	2.38E-08	6.74E-06

Construction Worker - Soil/Sediment Exposure Pathway Variables defined in Table 4.1.3 p93 RBGV Report 3/97
Equations listed in Table 4.1.3 p92 RBGV Report 3/97

Enter the following:

Series	Pa-231 to Pb-207		
Target Risk	1.00E-05		
Oral Cancer Slope Factor	7.66E-10	risk/pCi	
Inhalation Cancer Slope Factor	1.03E-07	risk/pCi	
External Cancer Slope Factor	5.42E-08	risk/pCi	

Cancer Slope Factors
HEAST Table 4

Series	Segment	Ingestion	Inhalation	External Exp
Pa-231	Ac-227	1.40E-10	2.42E-08	2.71E-08
Ac-227	Pb-207	6.26E-10	7.87E-08	2.71E-08
	Total	7.66E-10	1.03E-07	5.42E-08

Ingestion			
Target Risk	TR	1.00E-05	
Exposure Duration 1	ED_1	5	yrs
Exposure Frequency	EF	250	days/yr
Oral Cancer Slope factor	SF_0	7.66E-10	risk/pCi
Conversion Factor 1	CF_1	0.001	g/mg
Ingestion rate - Soil	IR_{soil}	480	mg/day
Radionuclide Concentration in Soil (Ingestion)	CS_{ing}	21.76	pCi/g
Inhalation			
Inhalation Cancer Slope factor	SF_i	1.03E-07	risk/pCi
Conversion Factor 2	CF_2	1000	g/kg
Inhalation Rate	IR_{air}	20	m^3/day
Soil to Air Volatilization Factor	VF	1	m^3/kg
Particulate Emission Factor	PEF	4.28E+09	m^3/kg
Radionuclide Concentration in Soil (Inhalation)	CS_{inh}	1.66E+04	pCi/g
External			
External Cancer Slope Factor	SF_e	5.42E-08	risk/pCi
Exposure Duration 2	ED_2	3.425	yrs
Gamma Shielding Factor	S_e	0.1	
Gamma Exposure Time factor	T_e	0.33	
Radionuclide Concentration in Soil (External Exposure)		179.74	pCi/g
Total			
	CS_{TOTAL}	1.94E+01	pCi/g

Appendix C

CONSIDERATIONS FOR INCLUDING DAUGHTERS OF U-238 AND U-235 IN THE CLEANUP GOALS FOR MOUND SOILS

Uranium 238 and 235 have been identified as potential contaminants of concern in some of the soils at Mound. The decay products or daughters of these materials can have a significant effect on the future risk levels and thus on the cleanup goals. However, since both U-238 and U-235 as well as their early daughters, U-234 and Pa-231, have very long half lives, the impact from the later daughters is only significant if they have had a long time to grow in and no chemical or physical process has removed them. Consequently, equivalent risk can be attained with a higher cleanup goal if the daughters had been removed prior to the original material being brought to Mound.

Historical information from the OU-9 Volume 7 Scoping Report identifies two programs at Mound that involved Uraniun – the Reactor Fuels Program and the Reactor Waste Decontamination Program

The Reactor Fuels Program involved conducting basic research on the chemical and physical properties of several potential fuels – including U-235. As potential reactor fuels, these materials would have already had the daughters removed. See Volume 7 for more details. Based on this information the U-235 cleanup goal does not need to explicitly include the risks from daughters.

The Reactor Waste Decontamination Program was established to evaluate waste treatment and disposal technologies for certain radioactive wastes from the reactor fuel processing operations. The radiochemical analyses of these various waste liquids indicate the presence of the parent, U-238 or Pu-239, and a number of fission products, but not daughter products. This would be expected if the wastes were “reactor wastes” and not “reactor fuel production wastes”. (See Volume 7, Waste Management Scop[ng Report for more details.) Based on this information, it is believed that the daughters do not need to be included in setting the U-238 cleanup goal. However, there is enough uncertainty in this position that a gamma spectroscopic analysis will be utilized to verify that the U-238 is not close to secular equilibrium. To obtain the necessary analytical sensitivity to accomplish this may require long count times and perhaps multiple counts on each sample. If the gamma spec indicates that the daughters have grown in to the point of having a significant impact on the cleanup goal, the cleanup goal will be adjusted to account for the impact of the daughters.

Implementation of this proposal for U-238 would follow the steps below:

If U-238 is a COC and is present at concentrations > 2.4 pCi/g (1.2 + bkg),

1. Use gamma spec to analyze for the daughters (e.g. – Th-230, Ra-226, and Pb-210) to evaluate for secular equilibrium. If secular equilibrium exists, use 2.4 pCi/g as U-238 cleanup goal. If secular equilibrium does not exist, adjust U-238 cleanup goal to take into account the daughter concentrations.

2. Use gamma spec to analyze for Cs-137 (fission product). If present at significant levels above background, analyze for other fission products such as Sr-90 and Tc-99.

If U-238 is a COC and is present at concentrations < 2.4 pCi/g (1.2 + bkg), both U-238 and the daughters are below levels that would require cleanup. Use gamma spec to analyze for Cs-137 (fission product). If present at significant levels above background, analyze for other fission products such as Sr-90 and Tc-99.

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Hierarchy For: Action Memorandum for Building HH Removal Action

Document that directed this document be produced: *Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach*, Final, Revision 0, February 1999.

LEVEL 1 LAWS/REGULATIONS (Imposed by Outside Authority)	FFA Action Memorandum
LEVEL 2 AGREEMENTS	
LEVEL 3 MOUND SITE-WIDE DOCUMENTS (POLICY & GUIDANCE FROM BWXT of Ohio)	
LEVEL 4 ORGANIZATIONAL/OPERATIONS DOCUMENTS	
LEVEL 5 PROCEDURAL/INSTRUCTIONAL DOCUMENTS	
LEVEL 6 REPORTS AND PERFORMANCE INDICATORS	